sacral vertebræ are shorter and thicker, and abut against the ossa innominata, as far back as the ischial tuberosities. The ilium, ischium, and pubis have coalesced to form one bone, as in some lizards and in mammalia; and, as in the latter class, the symphysis at which the ischio-pubic portion of each os innominatum joins its fellow is continuous; the pubic symphysis is not separated from the ischial symphysis. But ossification has advanced further than in any mammal, to the complete obliteration of the obturator foramina, which in most reptiles are represented by very wide vacuities. The pubic bones show an oblique perforation near the acetabulum, homologous with that which co-exists with large obturator openings in most lizards. The brim of this singularly massive pelvis measures 10 inches in antero-posterior, and 11 inches in transverse diameter: the outlet measures 4 inches in antero-posterior, and 9 inches in transverse diameter.

In the comparison of this, at present, unique type of pelvic structure, it is interesting to observe, in connexion with the mammalian tusks in the skull, a mammalian condition of the symphysis pubis, and also a mammalian expansion of the iliac bone. In the number of sacral vertebræ *Dicynodon* resembles the Dinosaurian reptiles, as well as some mammalia; and hence it may be inferred that, like the *Megalosaurus* and *Iguanodon*, a heavy trunk was in part supported on a pair of large hind limbs, the weight thereupon being transferred by a larger proportion of the vertebral column than in the prone crawling crocodiles and lizards of the present day.

The author, from certain associated fossils, deduces a probability of the triassic age of the sandstones including the above-described South African Reptilia, and remarks that it is in a sandstone of triassic age in Shropshire where fossil remains occur of a reptile which, in biting with trenchant edentulous jaws, also pierced its prey by a pair of produced weapons analogous to the tusks of *Dicynodon*. Of this reptile, the *Rhynchosaurus articeps*, Ow., the author describes the skull, vertebræ, and some other bones, which have been lately discovered in the New Red Sandstone of Grinsill, Shrewsbury. The remains of the limb-bones in this specimen bespeak a reptile capable of progression on dry land, as well as of swimming in the sea—of one that might leave impressions of its foot-prints on a tidal shore.

ROYAL INSTITUTION OF GREAT BRITAIN.

Friday, March 7, 1862.

"On the Distribution of Northern Plants." By Professor D. Oliver, of University College, London.

The discourse referred primarily to the botanical evidence bearing upon the hypothesis advanced by Professors Unger* and Heer† of an Atlantic communication between Europe and America at some period of the tertiary epoch. The close analogy which is to be traced between the miocene flora of Central Europe and the existing flora of the Eastern American States, these authors conceive can only be explained by assuming such direct overland connexion of the two continents.

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* 'Die versunkene Insel Atlantis.'

† 'Flora Tertiaria Helvetiæ.'

The speaker explained the basis upon which comparisons between two recent floras and between a recent and fossil flora should rest, referring to the peculiar conditions which affect the latter comparison owing to the imperfect and partial character of the fossil element. The general character of the tertiary flora of Central Europe was described. In the tertiary beds of Switzerland, according to Professor Heer*, about 800 species of Phanerogamia have been discovered, referable to 197 genera (exclusive of *Phyllites, Carpolithes,* &c.), of which number 145 still exist. Of these genera—

76	are common to the Swiss tertiary, and to the present flora of . .	Europe.
77	. . . . . .	Japan.
88	. . . . . .	United States, America.
120	. . . . . .	Europe and Asia (taken together, and including Japan).

It is to be noted that the 77 of Japan include 26 not occurring in Europe: amongst them several forms highly characteristic of the tertiary, as *Glyptostrobus*, numerous *Fici*, coriaceous-leaved oaks and *Lauraceæ, Juglandeæ, Liquidambar*, &c.

The genera common to the Swiss tertiary and the United States, which are not found also in the old world, are *Sabal, Taxodium, Bumelia, Liriodendron, Ceanothus, Ptelea*, and *Carya*. But in respect to these 7 it was observed that at least 5 were very doubtful determinations. The 9 largest orders of the 'Flora Tertiaria Helvetiæ' are *Leguminosæ, Amentaceæ, Cyperaceæ, Proteaceæ, Lauraceæ, Gramineæ, Coniferæ, Compositæ*, and *Aceraceæ*. Of these Orders 3 are included in the 9 largest of Europe, 4 in the 9 largest of the United States, and 6 in the 9 largest of Japan, while the remaining 3 of the tertiary, not included in the 9 largest orders of Japan, are much more largely developed in Japan than in the United States. They are *Lauraceæ, Aceraceæ*, and *Proteaceæ*.

The proportion of ligneous to herbaceous species in the above floras was alluded to. Heer estimates ligneous plants to have formed about 66 per cent. of the phanerogamic vegetation of the tertiary in Switzerland. The speaker considered this estimate as too high, believing that sufficient allowance had not been made for the advantages that ligneous plants, which are often tall-stemmed, possess over herbaceous species in securing access of their leaves and débris to the waters in which they had been floated and ultimately preserved. He admitted, however, that ligneous species were relatively very numerous in the vegetation of the tertiary period. The proportion of ligneous plants he estimates in the existing flora of Japan at near 40 per cent., in the Southern States 22, Northern States 18, Europe 9 to 12.

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* The Tertiary data were throughout derived from the 'Flora Tertiaria Helvetiæ' of Professor Heer.

The intimate relationship traceable between the tertiary and Japanese floras in the numerous characteristic types common to both; the issue of the ordinal and generic comparisons given above; the larger proportion of ligneous species in the Japanese than in the Eastern American flora; and the number of types peculiar, at the present day, to Eastern America and Eastern Asia, compared with the few restricted to Europe and America, the speaker contends, favour the view advanced by Professor Asa Gray in reference to plants, and by Mr. Darwin as to animals, viz., that the migration of forms to which is due the community of types in the Eastern States of North America and the miocene of Europe, took place to the north of the Pacific, an overland communication, it may be supposed, having existed during the tertiary time somewhere about Behring's Straits or the line of the Aleutian Islands. This view is confirmed by the occurrence of miocene vegetable remains in North-west America (including genera yet growing in Japan but lost to America), which prove, further, the temperature of these latitudes to have been at that time sufficiently high to have permitted their existence so far north.

The evidence in favour of the 'Atlantis' hypothesis might, moreover, be expected to have been more marked in the existing vegetation of the Atlantic Islands than is the case. Professor Heer points out the genera *Clethra, Bystropogon, Cedronella,* and *Oreodaphne* as common to the Atlantic Islands and America. Japanese species, however, have been described of *Clethra* and *Cedronella*; and Messrs. Webb and Berthelot limit *Bystropogon* to Atlantic-island species. *Oreodaphne* occurs in South Africa and adjacent islands.

A connexion between these islands and Europe, at perhaps a late period of the tertiary, may be considered as highly probable from the predominance of Mediterranean forms in their flora. The few genera characteristic of the tertiary which they possess may have been derived during this connexion; but the hypothesis that a continent should have extended westward as far as America, the speaker considered the available botanical evidence did not in the least substantiate.

MISCELLANEOUS.

On the Reproduction of Red Coral.

By M. de Lacaze Duthiers.

M. Lacaze Duthiers having been appointed by the Government of Algeria to investigate the natural history of the Red Coral, with a view to the regulation of its fishery, passed nearly a year on the African coast of the Mediterranean, in order to study the reproduction of that Zoophyte. Some of the results of his researches have recently been communicated to the Academy of Sciences.

He finds that the individual polypes of each colony are partly male and female and partly hermaphrodite, and that the individuals of one sex usually predominate over those of the other on particular branches—one branch consisting almost exclusively of male, and an-